

SOURCE INVENTORY

CATEGORIES #1010-1017, 1019-1023, 1025-1033, 1035, 1039, 1041-1056, 1058-1066, 1068, 1072, 1074-1083, 1085-1089, 1091-1099, 1101, 1105 1107-1108, 1275-1286

STRUCTURES COATING: SOLVENT BASE; WATER BASE; AND CLEANUP AND THINNING SOLVENT

1999 EMISSIONS

Methodologies

The California Air Resources Board (CARB) has conducted surveys of architectural coatings marketed in California every four or five years, with the first one in 1976, and the latest one in 1998. These surveys assist both CARB and local districts track organic emissions from architectural coatings. The “1998 Architectural and Industrial Maintenance Coating Survey” contains the latest (1996) data from which this report is based upon.

The categories include organic gas emissions resulting from the application of architectural coatings and associated thinning and cleanup solvents. Architectural coatings include a variety of coatings, for example: (1) paints - flats, and non-flats, (2) clears - lacquers, varnishes, and sealers, (3) stains, (4) industrial maintenance coatings, (5) specialty coatings, etc. These coatings are used on various structures, including bridges, buildings, streets, and roofs. Emissions occur from evaporation of the organic solvents during application and air drying of the coatings. To estimate organic solvent emissions, the quantity of various types of coatings and the associated solvent content in each coating should be known. Thinning and cleanup solvents are used only with solvent-base coatings. There are many types of coatings and each coating formulation has its own specific amount of solvent. Each type of coating is assigned a category number.

The Bay Area fraction of the California architectural coating sales was calculated using the number of housing units. The 1996 BAAQMD architectural coating sales (water and solvent based) was calculated by multiplying the total 1996 California architectural coating sales by the ratio of the District versus Statewide housing units. The Association of Bay Area Governments (ABAG) household growth profile was used to estimate the 1999 BAAQMD Architectural Coating sales. The 1999 ratio of solvent and water based coatings was estimated using the 1996 ratio as determined by the survey. This 1999 ratio was used to determine the District’s 1999 solvent and water based throughputs.

Estimated 1999 Bay Area architectural coatings throughputs (sales) were broken down into the various coating categories along with associated emission factors. They are shown in Table 1 for solvent based coatings and Table 2 for water based coatings. Organic emissions from the use of clean-up and thinning solvents were based on the assumption of one pint per gallon of solvent-based coatings. Estimates of cleanup and

thinning solvents associated with the use of these solvent-based coatings are shown in Table 3. The emission factor for clean-up and thinning solvents is 6.417 lbs./gal.

Monthly Variation

Monthly variation in emissions was made in proportion to the average monthly sales of coatings reported in the U.S. Department of Commerce of Paint and Allied Products.

County distribution

Estimated Bay Area coatings emissions were distributed proportionally to the number of housing units in each county.

TRENDS

Growth

Growth factors (both historical and projected) were based on ABAG's Households profile and the estimated ratio between solvent and water based coatings. (It was assumed after 1999, the ratio between solvent and water based coatings did not change.) Each coating had a separate growth profile. Since the clean up and thinning solvents categories' throughputs were proportional to their respective solvent based coatings categories' throughputs, their growth profiles were the same.

Controls

Regulation 8, Rule 3 was adopted by BAAQMD on March 1, 1978, and limits the volatile organic content of products sold for "application to stationary structures and their appurtenances, including houses, buildings, bridges, tanks, railings, streets and highways." Several amendments to the volatile organic contents of coatings have taken place, with the latest being in 1987. (A lawsuit was filed which overturned a 1990 amendment; final elements of this lawsuit were settled in 1998.) In 1998, an amendment incorporated provisions that would allow low solids architectural coatings to be sold and used within the BAAQMD. In June 2000, CARB approved a Suggested Control Measure (SCM) for architectural coatings. Although primary authority for controlling emissions from architectural coatings is given to the districts, this SCM serves as a model in reducing the VOC from the various coatings.

TABLE 1
1999 CONSUMPTION OF SOLVENT BASED STRUCTURAL COATINGS IN THE
BAY AREA

Cat #	Type of Coatings	1999 Usage (Gal/yr.)	1999 Estimated Emission Factors (lbs./gal)
1010	Flats	5,436	3.158
1011	Non-Flats, High Gloss	103,894	2.946
1012	Non-Flats, Medium Gloss	101,972	2.440
1013	Non-Flats, Low Gloss	6,712	2.834
1014	Non-Flats, Quick Dry Enamel	176,675	3.395
1015	Clear & Semi-Transparent Varnish	106,561	3.931
1016	Clear & Opaque Lacquer	122,232	5.470
1017	Sanding Sealers	21,631	5.719
1019	Stains, Clear & Semi-Transparent	196,778	3.688
1020	Stains, Opaque	24,873	3.154
1021	Wood Preservatives, Clear & Semi-Transparent	57,778	2.233
1022	Primers, Sealers, & Undercoats	307,241	3.005
1023	Quick Dry Primers, Sealers, & Undercoats	210,171	3.508
1025	Industrial Maintenance, High Temperature	4,460	3.153
1026	Industrial Maintenance, Other	762,050	2.765
1276	Industrial Maintenance, Extreme High Durability	4,268	3.369
1027	Traffic Paints	172,845	2.159
1028	Waterproofing Sealers, Clear	111,033	3.110
1029	Waterproofing Sealers, Opaque	9,320	2.851
1030	Concrete Curing Compounds	2,308	5.745
1031	Roof Coatings	22,686	2.212
1032	Dry Fog Coatings	14,970	3.058
1033	Fire Retardant Coatings, Opaque	2,010	2.307
1035	Metallic Pigmented Coatings	53,304	3.888
1039	Form Release Compounds	2,153	2.158
1041	Other Aggregated Specialty Coatings	78,567	3.224
1042	Other, Not Specified	29,282	2.946
1275	Bituminous	253,046	1.918
1277	Floor	96,383	1.693
1278	Swimming Pool Repair	2,494	4.916
	TOTAL	3,063,133	

TABLE 2

1999 CONSUMPTION OF WATER BASED STRUCTURAL COATINGS IN THE BAY AREA

Cat #	Type of Coatings	1999 Usage (Gal/yr.)	1999 Estimated Emission Factors (lbs./gal)
1043	Flats	6,864,728	.334
1044	Non-Flats, High Gloss	349,441	.776
1045	Non-Flats, Medium Gloss	3,261,219	.509
1046	Non-Flats, Low Gloss	958,601	.492
1047	Non-Flats, Quick Dry Enamel	0	
1048	Clear & Semi-Transparent Varnish	50,501	.886
1049	Clear & Opaque Lacquer	9,429	.732
1050	Sanding Sealers	1,115	.508
1051	Shellacs, Pigmented	0	
1052	Stains, Clear & Semi-Transparent	93,709	.817
1053	Stains, Opaque	300,446	.467
1054	Wood Preservative Clear & Semi-Transparent	16,036	.366
1055	Primer, Sealer, & Undercoats	1,012,326	.336
1056	Quick Dry Primer, Sealer, & Undercoats	180,604	.584
1058	Industrial Maintenance, High Temperature	38	.817
1059	Industrial Maintenance, Other	81,829	.701
1280	Industrial Maintenance, Extreme High Durability	0	
1060	Traffic Paints	431,354	.617
1061	Waterproofing Sealers, Clear	87,112	.475
1062	Waterproofing Sealers, Opaque	10,816	.584
1063	Concrete Curing Compounds	86,195	.651
1064	Roof Coatings	602,969	.050
1065	Dry Fog Coatings	27,251	.951
1066	Fire Retardant Coatings, Opaque	9,911	.250
1068	Metallic Pigmented Coatings	28,874	.409
1072	Form Release Compounds	15,589	.017
1074	Other Aggregated Specialty Coatings	88,107	.565
1075	Other, Not Specified	11,901	.217
1279	Bituminous	782,256	.017
1281	Floor	141,908	.659
1282	Swimming Pool Repair	0	
	TOTAL	15,501,263	

TABLE 3
1999 CONSUMPTION OF CLEANUP AND THINNING SOLVENT IN THE
BAY AREA

Cat #	Type of Coatings	1999 Usage (Gal/yr.)
1076	Flats	679
1077	Non-Flats, High Gloss	12,987
1078	Non-Flats, Medium Gloss	12,746
1079	Non-Flats, Low Gloss	839
1080	Non-Flats, Quick Dry Enamel	22,084
1081	Clear & Semi-Transparent Varnish	13,320
1082	Clear & Opaque Lacquer	15,279
1083	Sanding Sealers	2,704
1085	Stains, Clear & Semi-Transparent	24,597
1086	Stains, Opaque	3,109
1087	Wood Preservatives, Clear & Semi-Transparent	7,222
1088	Primers, Sealers, & Undercoats	38,403
1089	Quick Dry Primers, Sealers, & Undercoats	26,271
1091	Industrial Maintenance, High Temperature	557
1092	Industrial Maintenance, Other	95,256
1284	Industrial Maintenance, Extreme High Durability	533
1093	Traffic Paints	21,606
1094	Waterproofing Sealers, Clear	13,879
1095	Waterproofing Sealers, Opaque	1,166
1096	Concrete Curing Compounds	289
1097	Roof Coatings	2,836
1098	Dry Fog Coatings	1,871
1099	Fire Retardant Coatings, Opaque	251
1101	Metallic Pigmented Coatings	6,663
1105	Form Release Compounds	269
1107	Other Aggregated Specialty Coatings	9,821
1108	Other, Not Specified	3,660
1283	Bituminous	31,631
1285	Floor	12,048
1286	Swimming Pool Repair	312
	TOTAL	382,890